Section 9. Population Projections

Introduction

This document has examined trends in criminal justice activities and the larger community for more than 25 years. This "long look" provides a context in which population projections can be evaluated.

- In 1973, the first year for which jail data is available, Hamilton County had a jail population of 660; in 2004, jail population was 2,059. This is a three-fold increase.
- A number of studies have projected jail population in the past. Although they varied, all reflected increases, but little additional capacity has been provided since Queensgate opened in 1992.
- Hamilton County has, however, invested in a broad spectrum of alternatives to incarceration and has developed a number of procedural interventions to expedite case processing through the courts.
- In spite of the implementation of these alternatives, jail population has continued to grow, resulting in the need to use early release and "process only" methods to stay within the capacity at HCJC.
- The capacity which has been available at Queensgate, Reading Road, and Turning Point has been under-utilized, because the profile of inmates who need to be housed is not consistent with the limitations and/or special purposes of these facilities.

Limitations of Population Forecasting

Population forecasting is not an exact science, and past efforts to identify future Hamilton County correctional populations which have been documented in Section 1 clearly bear out that statement. Average daily population in the facility results from the interaction of two statistics: admissions to the facility and their length of stay. Unfortunately, multiple factors influence facility admissions and length of stay. Changes in law, criminal justice policy and practice, the economy and the social environment of the jurisdiction will influence how many people are taken to jail and how long they stay. As a result, the estimates of future capacity realistically must be considered as *baselines*. A baseline forecast identifies *what the population is likely to be if the current trends continue.* While it is possible to calculate the impact of *known* changes, there are too many items that will effect the County's criminal justice system in years to come that are simply unknowable today. Jurisdictions typically confront this problem by two strategies:

- Modifying the baseline to include known changes in criminal justice practices, and
- Providing an easily expandable and adaptable building that is flexible enough to respond to change.

Methodologies

Short-term Strategies

There are a variety of short-term strategies for estimating future population; the most common of these are linear regression or a simple percentage of increase. Both of these have similar problems:

-     It can be difficult to identify when a new trend is emerging.
-     When data is limited, the forecast should be limited to the same number of data points.
-     If continued to infinity, these methods will become less and less accurate as the error of the estimate increases.

These short-term techniques are not able to reflect any changes in practice or criminal justice policy; the only variable used to predict future populations is time. The long-term methods used in this section integrate the impact of changes in criminal justice practice and policy in the incarceration rate, and reflect changes in the population of the jurisdiction as well. Short-term projections will differ from long-term and are very likely to be less accurate. As a result, these short-term methods have limited usefulness. They do, however, provide a good indicator of when trends are changing when they are compared on a monthly basis with actuals. Short-term forecasts of expected Average Daily Population (ADP) and admissions will be provided in this section.

Long-term Strategies

Most long-term population forecasting establishes a relationship between the population of the jurisdiction and a detention statistic (i.e., average daily population). The resulting statistic is called an incarceration rate (the relationship between the population of the jurisdiction and the population in detention). These relationships are studied over time to identify trends. They are particularly useful, because they allow comparison across jurisdictions of varying sizes.

If the incarceration rate is used to project future population, the expected incarceration rate for a future year is multiplied by the expected population of the jurisdiction for that year; this provides an estimate of average daily population for that year. That result, in turn, has to be multiplied by a factor (called a peaking factor) to accommodate the daily and seasonal fluctuation in average daily population as well as classification needs. The result is the baseline capacity of the facility. This method will be used to develop a baseline forecast, which will then need to be modified to reflect known issues, such as the early release of a significant number of female offenders.

Short-term Population Estimates

Admissions

Figure 9.1 Short-term Projection Admissions
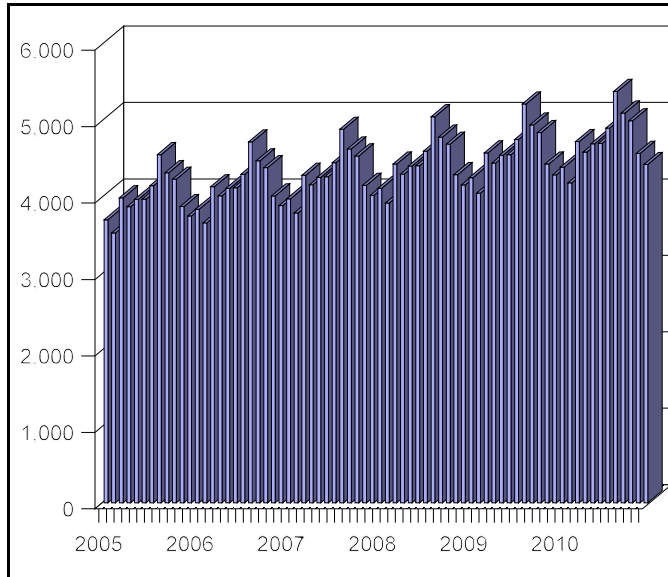
As noted in section four, the trend in admissions was characterized by a period when admissions were much higher than in previous or subsequent months. When that period (May 1998 to November 2000) is removed, the remaining trend is quite strong (r=.75). This trend has 126 data points (10 and a half years). A projection of five years should provide useful and relatively accurate information about the number of people coming into the system. This trend was then adjusted for seasonal variations based on the past patterns also provided in section four. Table 9.1 suggests that if the current practices

Table 9.1 Short-term Projection Admissions

Year	Short-term Projection Admissions
2005	47,918
2006	49,666
2007	51,414
2008	53,162
2009	54,910
2010	56,658
Daily Average	155
Hourly Average	6

continue, Hamilton County can expect to admit about 2,000 more people each year, for the next five years. This would result in an estimated 56,658 admissions in 2010, an average of 155 new admissio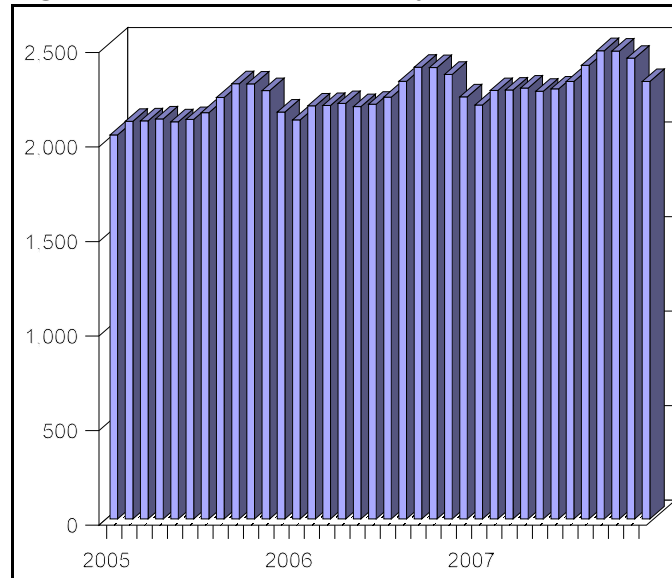ns per day, or six per hour. Unfortunately, these admissions are not distributed evenly across the day, resulting in likely hourly admissions in excess of 12 an hour during routinely "busy" periods. Given physical plant issues that are discussed elsewhere in this report, this volume of admissions (which then trigger court appearances and releases) will be challenging to manage.

Average Daily Population (ADP)

Figure 9.2 Short-term ADP Projections

The trend in ADP is not as strong as the trend in admissions. When the entire period from 1993 is used, the trend in ADP is so weak (r=.12) as to be unuseable. However, when the trend from 2002 forward

Table 9.2 Short-term ADP Projections

Year	Expected ADP	Capacity	Occupancy %
2005	2,163.73	2,272	95%
2006	2,246.51	2,272	99%
2007	2,329.30	2,272	103%

is analyzed, it is considerably stronger (r=.69). Because it does not include many months, only a short period of time should be estimated from this trend. However, when adjusted for seasonal trends, it does suggest population levels that will exceed current system capacity within the next three years. In the past, Hamilton County has managed these events, which will be most pronounced in the warm weather months, by early releasing inmates. It seems likely that early release and process only will become "standard operating procedure" for periods of this year and regularly within two years.

It is also worth noting that most local correctional facilities begin to experience crowding within some housing areas when overall populations reach approximately 85% of capacity. Unlike prisons, which have the ability to control when they admit new prisoners, jails can not. As a result, there must always be space available for new admissions. In addition, prisons, which tend to hold inmates of the *same* classification, local correctional facilities hold *many different* classifications, which must be housed separately. This often results in situations in which beds are available in one housing unit, but there are no prisoners appropriate for that unit, while other housing units have many more inmates than they have available beds.

Incarceration Rates

National, Regional, State and County Incarceration Rates

Figure 9.3 National, Regional, State and Hamilton County Incarceration Rates
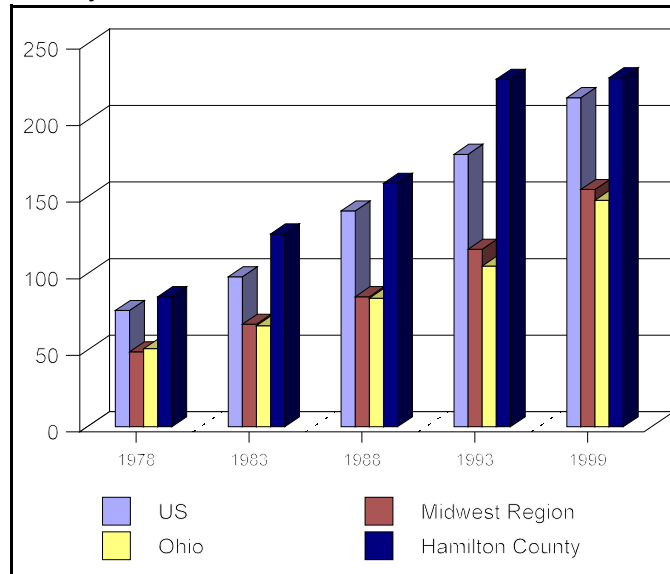
Incarceration rates are among the most useful measures of how a jurisdiction uses its jail space since they allow comparison with other jurisdictions which may be of a different size. Incarceration rates express the population of the jail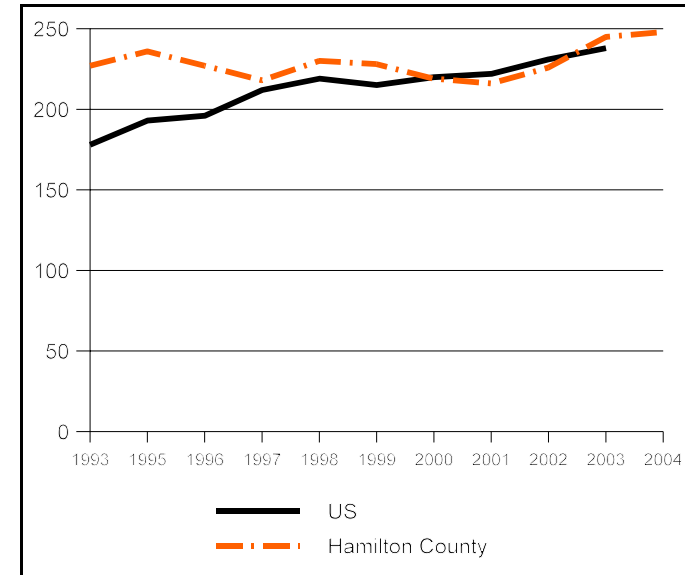 as a function of the county population. The result is multiplied by 100,000, to calculate the incarceration rate. The incarceration rate is similar to the index crime rate.

Figure 9.4 National and Hamilton County Incarceration Rates

Table 9.3 National, Regional, State and County Incarceration Rates

Jurisdiction	1978	1983	1988	1993	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
US	76	98	141	178	193	196	212	219	215	220	222	231	238	NA
Midwest Region	49	67	85	116					155					
Ohio	51	66	84	105					148					
Hamilton County	85	126	159	227	236	227	218	230	228	219	216	226	245	248

The Bureau of Justice Statistics conducts a census of the nation's jails every five years. Annually it publishes a report on prison and jail inmates at midyear. Incarceration rates are published for responding jails.

Nationally, between 1978 and 1999, the incarceration rate increased 183%; the increase to 2003 is even more significant at 213%. There are significant differences among the regions in the US. Incarceration rates are higher in the West and the South than they are in the North and the Midwest. Between 1978 and 1999, incarceration rates in the Midwest increased 216%. Between 1978 and 1999,

incarceration rates in the Ohio increased 190%. Hamilton County's incarceration rate has increased 168%, while the increase from 1978 - 2003 is greater at 188%. During this period, Hamilton County's incarceration rate, like that of many urban counties, has been higher than the Ohio average.

The pattern in Hamilton County's incarceration rate is interesting when viewed in the light of facility and programmatic development in the County. Figure 9.3 displays information from the five year Bureau of Justice of Statistics Census of Jails; the figure clearly shows the parallel between the US and Hamilton County's incarceration rate until 1993 when Hamilton County's incarceration rate grew significantly. This is likely to relate to the addition of Queensgate, which addressed "pent up capacity" in the criminal justice system. After that time, Hamilton County's incarceration rate stayed virtually level until 2000 when it decreased, remaining essentially level in 2001. Because incarceration rates are based on changes in county population, it is important to note that 2000 was a census year. In Hamilton County, the resident population decreased less than had been estimated by the census. As a result, the decrease in the incarceration rate can also relate to an higher than anticipated county population. Beginning in 2002, Hamilton County's incarceration rate began to increase again. On average, during the period between 1997 and 2004, Hamilton County's incarceration rate has increased 5.64/100,000 per year.

National Trend in Female Incarceration Rate

Table 9.4 Trend in US Gender Incarceration Rates

Category	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Male	302	313	322	326	337	346	346	375	387	388	393	399	417	426
Female	29	31	31	33	36	38	41	43	46	48	49	50	53	56

Figure 9.5 National Trend in Female Incarceration Rate

Figure 9.6 Comparison of Hamilton County and US Female Incarceration Rates
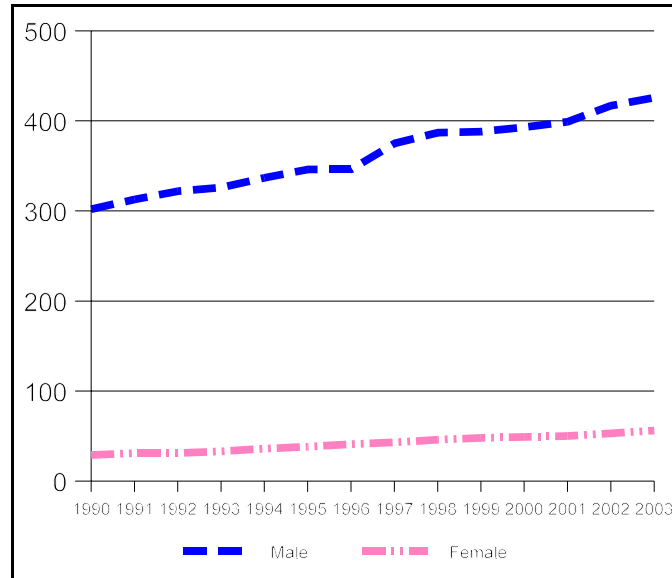
Beginning in 2001, BJS began to report incarceration rates by gender. The consultant was able to compute incarceration rates by gender by using the male and female jail population statistics from BJS and census data regarding US male and female population.

Review of Table 9.4 reveals that the rate at which the US incarcerated jail population is growing is not uniform across gender. Between 1990 and 2003, the US incarceration rate increased 47% from an estimated 162/100,000 to 238/100,000. However, the rate at which females are incarcerated increased most significantly (92%) from an estimated 29/100,000 to 56/100,000, while the rate for males increased 41%, from an estimated 302/100,000 to 426 per 100,000. This information is particularly useful, because it provides a strategy to address female "under-representation" in the jail population.

Table 9.5 Trend in Hamilton County Female Incarceration Rate

Year	Female Jail ADP	Female County Population	Female Incarceration Rate
1992	210	453,530	46
1993	210	452,130	46
1994	252	450,730	56
1995	267	449,330	59
1996	265	447,930	59
1997	244	446,530	55
1998	255	445,130	57
1999	243	443,730	55
2000	253	442,330	57
2001	238	440,099	54
2002	248	437,868	57
2003	270	435,637	62
2004	273	433,406	63

Review of Figure 9.6 shows that there are differences in the national and Hamilton County patterns of incarceration. These differences are somewhat similar to those shown in Figure 9.4 which compared overall US and Hamilton County incarceration rates. However, the differences lie in the degree to which the female national rate has increased (92%) in contrast to a more modest increase in Hamilton County (36%). Given the fact that the County has had capacity issues for the female offender population since 1993 and because the female incarceration rate began at a significantly higher level than the national rate, it is likely that capacity for females has restricted increase in the female incarceration rate in Hamilton County. When additional capacity becomes available, then, it is very likely that the incarceration rate will increase more than the current trend suggests.

Projected County Population

The Hamilton County Regional Planning Commission projects that the County will continue to see a decrease in population as discussed in Section 2. This suggests that the County will have a population of approximately 756,000 in 2030, with population growing in the townships and decreasing in the City of Cincinnati. It is worth reiterating that development within the City has the potential to modify this demographic shift.

Table 9.6 Projected Hamilton County Population

Year	Hamilton County	Hamilton County Female
1970	924,018	486,774
1980	873,224	460,016
1990	866,228	456,330
2000	845,303	442,330
2010	811,548	420,020
2020	782,812	399,970
2025	769,477	389,900
2030	756,142	378,450

Scenarios for Future Jail Capacity Requirements

This section constructs several scenarios for future capacity requirements; each scenario identifies the assumptions that are used in its development.

Scenario 1. Continuation of Long-term Practices

Table 9.7 Scenario Based on Continuation of Long-term Practices

Year	Expected County Population	Expected Incarceration Rate	Expected Jail ADP	Jail Capacity
2010	811,548	281	2,283.61	2,566
2015	797,180	310	2,378.11	2,672
2020	782,812	338	2,644.43	2,971
2025	769,477	366	2,816.46	3,164
2030	756,142	394	2,980.97	3,349

This scenario is based on the following assumptions:
- Hamilton County population decreases as projected by the Regional Planning Commission.
- The incarceration rate increases annually as it did, on average, from 1973 - 2004 (5.64 persons/100,000 per year).
- Peak populations are based on current peaking factors which have been no more than 107% of the highest seasonal variation (105% of the annual average).

This scenario carries out these assumptions through 2030; it includes capacity related to females. As the system currently has 2,272 beds, this approach would require about 1,075 additional beds.

Scenario 2. What if Jail Population Hadn't Decreased in 2001?

Table 9.8 What If the Jail Population Hadn't Decreased in 2001?

Year	Expected County Population	Expected Incarceration Rate	Expected Jail ADP	Jail Capacity
2010	775,871	286	2,216.05	2,490
2015	775,847	313	2,425.74	2,725
2020	794,957	340	2,700.41	3,034
2025	825,628	367	3,027.82	3,402
2030	862,531	394	3,396.35	3,816

This scenario is based on the following assumptions:
- Hamilton County initially decreases and then in approximately 2020 begins to increase again.
- The incarceration rate increases annually as it did from 1973 to 2000, eliminating the impact of system changes which occurred between 2000 and 2004.
- Peak populations are based on current peaking factors which have been no more than 107% of the highest seasonal variation (105% of the annual average).

This scenario carried out these assumptions through 2030. This scenario reflects a high increase in the incarceration rate (5.40 inmates per 100,000 per year). This scenario results in higher capacity requirements after 2020, but is relatively close to Scenario 1 through 2020.

Scenario 3. Female Offender Capacity Requirements Based On Current Practices

Table 9.9 Scenario for Female Offenders Based on Current Practices

Year	Expected County Female Population	Expected Incarceration Rate	Expected Jail Female ADP	Jail Female Capacity
2010	420,020	71	299.61	343
2015	409,995	78	320.96	367
2020	399,970	85	340.92	390
2025	389,900	92	359.45	411
2030	378,450	99	375.20	429

This scenario is based on the following assumptions:
- The female population of Hamilton County decreases as projected by the Regional Planning Commission.
- The incarceration rate of female inmates increases as it did, on average, from 1993 - 2004 (1.39 persons/100,000 per year).
- Peak populations are based on current peaking factors which have been no more than 109% of the highest seasonal variation (105% of the annual average).

This scenario carries out these assumptions through 2030. As the system currently has 315 beds for women, 107 of which are treatment and medical beds, this approach would require at least 115 additional beds for women, assuming that the type of specialty beds which are currently available should remain.

Scenario 4. "What If" Female Offender Capacity Requirements

As noted elsewhere in this analysis, it is clear that female offenders have been the most likely to be "early released" or "processed only." The female offender incarceration rate has not grown at the same rate as the national rate. There is additional evidence that while women account for 21% of bookings currently, they account for about 10% of average daily population. As a result, it would be wise to develop a scenario that is based on an incarceration rate that is not constrained by space limitations. Table 9.10 shows what the Hamilton County female offender ADP would have been since 1992 if the annual increase in incarceration rate seen nationally had occurred in Hamilton County.

Table 9.10 "What If" Female Hamilton County Jail ADP

Year	Actual Female Jail ADP	What If Female Jail ADP	Female County Population	Female Incarceration Rate
1992	210	210	453,530	46
1993	210	219	452,130	48
1994	252	227	450,730	50
1995	267	236	449,330	52
1996	265	244	447,930	55
1997	244	253	446,530	57
1998	255	261	445,130	59
1999	243	270	443,730	61
2000	253	278	442,330	63
2001	238	285	440,099	65
2002	248	293	437,868	67
2003	270	301	435,637	69
2004	273	308	433,406	71

Table 9.10 shows that the female offender population would have reached an average of 308 in 2004 rather than 273.

Table 9.11 Scenario for Female Offenders Based on "What If" Assumptions

Year	Expected County Female Population	Expected Incarceration Rate	Expected Jail ADP	Jail Capacity
2010	420,020	83	350.45	401
2015	409,995	94	384.38	440
2020	399,970	104	416.23	476
2025	389,900	114	445.97	510
2030	378,450	125	471.91	540

This scenario is based on the following assumptions:
- The female population of Hamilton County decreases as projected by the Regional Planning Commission.
- The incarceration rate of female inmates increases from the level it had reached in 1992 (before early releases began for this population, at the rate seen in national trends (2.06 persons/100,000 per year).
- Peak population are based on current peaking factors which have been no more than 109% of the highest seasonal variation (105% of the annual average).

This scenario carries out these assumptions through 2030. As the system currently has 315 beds for women, 107 of which are treatment and medical beds, this approach would require at least 225 additional beds for women, assuming that the type of specialty beds which are currently available should remain.

Analysis of Housing Options

Review of these scenarios with the Core Team has resulted in the consensus that Scenario 1, with the adjustment for additional females as estimated in Scenario 4 seems most reasonable. Further, although it is clear that the County needs to plan for capacity needed in 25 years (2030), that an initial phase of housing capacity should be less for several reasons:
- Implementation of enhanced treatment programming, based on evidence-based practices, with a more comprehensive re-entry process, should reduce the proportion of inmates who are recidivists. Incarceration alone results in approximately 70% recidivism,

while appropriate and effective programming, can reduce recidivism for the same period to 40%. That suggests that efforts the County plans to test in its "Off the Streets" initiative could reduce need.
- Our ability to know the kind of housing that will be required in fifteen years is limited.

As a result, a phased approach which includes the following elements is suggested:
- Sizing core areas of the facility, i.e., food service, laundry, mechanical, and other areas, such as intake which are difficult to expand at a later date, to accommodate a larger population.
- Reserving space on the site to add capacity.

Table 9.12 System Capacity Summary of Retained, Replacement and New Beds

2020 Target Capacity based on Most Likely Scenario (Scenario 1) =			2,971
	Female	**Male**	**Total**
Capacity Needed	390	2,581	2,971
Female Space Needed to Compensate for Processing Only, Early Release	476		
Added female Beds	86		
Revised Capacity Needed			3,057
	Retained Beds	**Replacement Beds**	**New Beds**
HCJC - becomes all male, maximum and medium	1,240		
Queensgate Male		822	
Reading Road Male		50	
Reading Road Female		100	
Turning Point		60	
Subtotal Replacement Beds		1,032	
New Beds (Revised Capacity - HCJC - Replacement Beds)			785
New and Replacement Beds			1,817
Units (ideal efficiency of 60)			30.28
Ideal Efficiency capacity			1,800

Given the amount of time required to complete correctional planning projects (an average of 44 months) and the desire to provide for a period of no less than ten years of operation without the need for major construction, an initial construction phase should be developed to accommodate the County's need for approximately 15 years (2020).

Table 9.12 summarizes suggested capacity requirements. The 2020 capacity identified in the most likely scenario did not originally include a method to compensate for early release and process only of females. By including the additional beds projected for the female population, a revised capacity of 3,057 is identified.

The current housing plan makes the assumption that the capacity of HCJC will remain at 1,240; this facility will house maximum and higher security medium males; capacity currently used for females in this facility will be used for maximum and medium males as females are relocated to the new facility. Replacement beds required are 822 male beds at Queensgate, the 50 male beds at Reading Road, 100 female beds, and the 60 male beds at Turning Point. This results in the need to replace 1,032 beds, resulting in a total of 785 new beds.

When new and replacement beds are combined, the capacity to be built is 1,817. However, a better efficiency is obtained by constructing units of 60; this would result in the construction of 1.800 beds. Table 9.13 provides an initial estimate of how these beds would be divided.

Housing Configuration	Unit	Cell Count	Single	Double	Four Person	Dorm Bed Count	Capacity	Cell Type
Female Housing								
Female Housing Group 1 = 188								
Mental health	1-A	16	16		4		32	Single (10) and 4 person cell (4)
Medical	1-B	24	16	8			32	Single/double (half and half)
Medical/Mental Health Transition	2-A	24	16	8			32	Single/double (half and half)
Intake/Special Management Female	2-B	32	32				32	Single
Unit 3/Orientation/Assessment	3	30		30			60	Double
Female Housing Group 2 = 300								
Female General Population	4					60	60	Dorm
Female General Population	5					60	60	Dorm
Female Program Housing	6					60	60	Dorm
Female Program Housing	7					60	60	Dorm
Unit 8 - Pre-Release	8					60	60	Dorm
Subtotal Female		126	80	46	4	300	488	
Male Housing								
Male Housing Group 1 = 144								
Mental Health 1	1-A	24	24				24	Single
Mental Health 2	1-B	32	32				24	Single
Mental Health 3	1-C	32	32				24	Single
Mental Health 4	2-A	32	32				24	Single
Mental Health 5	2-B	16		16			24	Double
Male Housing Group 2 = 144								
Medical Housing 1	3-A	16		16			32	Double
Medical Housing 2	3-B	16		16			32	Double
Infirmary	4-A	24	24				24	Single
Medical Transition	4-B	28		28			56	Double
Male Housing Group 3 = 240								
Male Intake	5-A	60	60				60	
Male Intake	5-B	60	60				60	
Male Orientation	5-C	60	60				60	
Male Orientation	5-D	60	60				60	

Housing Configuration	Unit	Cell Count	Single	Double	Four Person	Dorm Bed Count	Capacity	Cell Type
Male Housing Group 4 = 240								
Male General Population	6-A					60	60	
Male General Population	6-B					60	60	
Male General Population	6-C					60	60	
Male General Population	6-D					60	60	
Male Housing Group 5 = 180								
Male General Population	7-A					60	60	
Male General Population	7-B					60	60	
Male Turning Point	7-C					60	60	
Male Housing Group 6 = 180								
Male Substance Abuse Treatment	8-A					60	60	
Male Inside Workers	8-B					60	60	
Male Inside Workers	8-C					60	60	
Male Housing Group 7 = 180								
Pre-release/Outside Details	9-A					60	60	
Pre-release/Outside Details	9-B					60	60	
Pre-release/Outside Details	9-C					60	60	
Subtotal males		460	384	76	0	780	1,284	
Total		586	464	122	4	1,080	1,772	
New and Replacement Beds Needed							1,817	
Total System Capacity							3,012	

Conclusion

1. In all cases, it will be important to analyze the types of beds needed and to develop an efficient configuration of housing based on the most efficient staffing pattern that will provide the level of supervision and services required by the offender population. The approach identifies above is designed around efficiently sized operating groups for the various classifications held.
2. Although the site and core areas of the facility should be developed to allow expansion, it is suggested that housing beds be based on the 2020 projection. The intent of the system is to put in place programming which will impact recidivism, allowing this capacity to take the County through a longer time period before additional construction would be required.
3. While scenario 1 is generally the scenario suggested as most likely and reasonable, it needs to be modified to reflect additional capacity for females, raising overall system capacity to 3,012.